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of the organs in action showed them to be used as intakes for water during inspiration. They are used in this way both while the mouth is so used and also when it is closed tightly. Each of these two internal openings is provided with an independent valve which automatically prevents the regurgitation of water.

Besides these openings the nasal cavity is also provided with the usual anterior and posterior nares. A fuller account of this structure will appear shortly in another journal.

ULRIC DAHLGREN

SPECIAL ARTICLES

BLACKHEAD, A COCCIDIAL DISEASE OF TURKEYS¹

IN many districts of the United States, and in Rhode Island in particular, there has been known to exist since about 1894 a highly infectious disease affecting the ceca and liver of turkeys and, to a less extent, of fowls. It is characterized, in the ceca, by inflammation, thickening, occasional perforation of the walls and denudation of the epithelium; in the liver by enlargement and by the formation of cream-yellow spots.

Since the investigations of Theobald Smith, published in 1895, it has been commonly believed that the disease is due to an ameba, *Amœba meleagridis* Smith. The present writers believe they have demonstrated, however, that the disease is caused by a *Coccidium*, which, according to the nomenclature adopted, may be a variety of *Coccidium cuniculi*, and that *Amœba meleagridis* Smith is probably the schizont stage in the development of the *Coccidium*.

The stages of the *Coccidium* most commonly found were the schizonts and the macrogametes or oocytes. The former were first discovered in smears by means of a rose-analin-violet and methylene-blue stain. Later they were recognized in fresh preparations, both within and without the epithelial cells. The macrogametes were most common in the cecal and the intestinal content below the junction of the ceca, and were often present when the cyst stage was absent. Besides these stages

the microgametocytes, the microgametes, the merozoites and the sporozoites were recognized both in fresh preparations and in sections stained with hematoxylin and eosin.

By placing the cecal content containing macrogametes in a solution of 10 per cent. potassium bichromate, the growth of bacteria was stopped and the development into cysts and then into sporozoites could be watched. The cysts are commonly oval, and have an average size of 21 by 14 micra. Cultures containing cysts were also made to develop in 2 per cent. formalin, saturated solution of thymol, 4 per cent. boracic acid, 1 per cent. lysol and 2 per cent. carbolic acid. The organism is common in the soil and is frequently found in apparently normal fowls, which do not appear to be so susceptible as turkeys to this form of the disease.

By means of feeding portions of cecal content or parts of ceca of diseased birds, the disease was produced experimentally in turkeys, chicks and sparrows, but not in guinea-pigs, kittens or in rabbits. In young turkeys the disease is almost certainly fatal; older birds may recover. It is doubtful if death is caused directly by the *Coccidium* in the majority of cases; whether there is a specific accompanying organism pathogenic to turkeys under these conditions, and less so to chickens, has not yet been determined. In cases of perforation of the cecum, death soon follows from acute peritonitis. No method of treatment is at present recognized.

The investigations reported above were made at the Rhode Island Agricultural Experiment Station, in cooperation with the Bureau of Animal Industry, U. S. Department of Agriculture, during the year 1906-7.

LEON J. COLE

PHILIP B. HADLEY

THE NATIONAL CONSERVATION COMMISSION

PURSUANT to the recent Conference of Governors in the White House on the conservation of our natural resources, the President on June 8 appointed a National Conservation Commission, comprising Senators and Representatives in Congress, scientific and technical

¹ Abstract of paper read before the Zoologists' meeting at New Haven, December, 1907.

experts, and citizens of the several sections of the country.

The instructions to the Commissioners are as follows:

THE WHITE HOUSE,
WASHINGTON, June 8, 1908.

The recent Conference of Governors in the White House confirmed and strengthened in the minds of our people the conviction that our natural resources are being consumed, wasted and destroyed at a rate which threatens them with exhaustion. It was demonstrated that the inevitable result of our present course toward these resources, if we should persist in following it, would ultimately be the impoverishment of our people. The Governors present adopted unanimously a Declaration reciting the necessity for a more careful conservation of the foundations of our national prosperity, and recommending a more effective cooperation to this end among the States and between the States and the Nation. A copy of this Declaration is enclosed.

One of the most useful among the many useful recommendations in the admirable Declaration of the Governors relates to the creation of State commissions on the conservation of resources, to cooperate with a Federal Commission. This action of the Governors can not be disregarded. It is obviously the duty of the Federal Government to accept this invitation to cooperate with the States in order to conserve the natural resources of our whole country. It is no less clearly the duty of the President to lay before the Federal Congress information as to the state of the Union in relation to the natural resources, and to recommend to their consideration such measures as he shall judge necessary and expedient. In order to make such recommendations the President must procure the necessary information. Accordingly, I have decided to appoint a Commission to inquire into and advise me as to the condition of our natural resources, and to cooperate with other bodies created for a similar purpose by the States.

The Inland Waterways Commission, appointed March 14, 1907, which suggested the Conference of Governors, was asked to consider the other natural resources related to our inland waterways, and it has done so. But the two subjects together have grown too large to be dealt with by the original body. The creation of a Commission on the Conservation of Natural Resources will thus promote the special work for which the Inland Waterways Commission was created, and

for which it has just been continued and enlarged, by enabling it to concentrate on its principal task.

The Commission on the Conservation of Natural Resources will be organized in four sections to consider the four great classes of water resources, forest resources, resources of the land and mineral resources. I am asking the members of the Inland Waterways Commission to form the Section of Waters of the National Conservation Commission. In view of the lateness of the season and the difficulty of assembling the members of the sections at this time, a Chairman and a Secretary for each Section have been designated, and the Chairman and Secretaries of the Sections will act as the Executive Committee, with a Chairman who will also be Chairman of the entire Commission. I earnestly hope that you will consent to act as a member of the Commission, in common with the following gentlemen:

Waters

Hon. Theodore E. Burton, Ohio, *Chairman*.
Senator William B. Allison, Iowa.
Senator Francis G. Newlands, Nevada.
Senator William Warner, Missouri.
Senator John H. Bankhead, Alabama.
Mr. W J McGee, Bureau of Soils, *Secretary*.
Mr. F. H. Newell, Reclamation Service.
Mr. Gifford Pinchot, Forest Service.
Mr. Herbert Knox Smith, Bureau of Corporations.
Hon. Joseph E. Ransdell, Louisiana.
Prof. George F. Swain, Institute of Technology, Mass.
The Chief of Engineers, U. S. Army.

Forests

Senator Reed Smoot, Utah, *Chairman*.
Senator Albert J. Beveridge, Indiana.
Senator Charles A. Culberson, Texas.
Hon. Charles F. Scott, Kansas.
Hon. Champ Clark, Missouri.
Mr. J. B. White, Missouri.
Prof. Henry S. Graves, Yale Forest School, Connecticut.
Mr. William Irvine, Wisconsin.
Ex-Governor Newton C. Blanchard, Louisiana.
Mr. Charles L. Pack, New Jersey.
Mr. Gustav Schwab, National Council of Commerce, New York.
Mr. Overton W. Price, Forest Service, *Secretary*.

Lands

Senator Knute Nelson, Minnesota, *Chairman*.
Senator Francis E. Warren, Wyoming.
Hon. John Sharp Williams, Mississippi.
Hon. Swager Sherley, Kentucky.
Hon. Herbert Parsons, New York.
Mr. James J. Hill, Minnesota.
Ex-Governor N. B. Broward, Florida.
Ex-Governor George C. Pardee, California.

Mr. Charles McDonald, American Society of Civil Engineers, New York.
 Mr. Murdo Mackenzie, Colorado.
 Mr. Frank C. Goudy, Colorado.
 Mr. George W. Woodruff, *Secretary*.

Minerals

Hon. John Dalzell, Pennsylvania, *Chairman*.
 Senator Joseph M. Dixon, Montana.
 Senator Frank P. Flint, California.
 Senator Lee S. Overman, North Carolina.
 Hon. Philo Hall, South Dakota.
 Hon. James L. Slayden, Texas.
 Mr. Andrew Carnegie, New York.
 Prof. Charles R. Van Hise, Wisconsin.
 Mr. John Mitchell, Illinois.
 Mr. John Hays Hammond, Massachusetts.
 Dr. Irving Fisher, Yale University, Connecticut.
 Mr. Joseph A. Holmes, Geological Survey, *Secretary*.

Executive Committee

Mr. Gifford Pinchot, *Chairman*.
 Hon. Theodore E. Burton.
 Senator Reed Smoot.
 Senator Knute Nelson.
 Hon. John Dalzell.
 Mr. W. J. McGee.
 Mr. Overton W. Price.
 Mr. G. W. Woodruff.
 Mr. Joseph A. Holmes.

One of the principal objects of the Federal Commission on the Conservation of Natural Resources will be to cooperate with corresponding commissions or other agencies appointed on behalf of the States, and it is hoped that the Governors and their appointees will join with the Federal Commission in working out and developing a plan whereby the needs of the Nation as a whole and of each State and Territory may be equitably met.

The work of the Commission should be conditioned upon keeping ever in mind the great fact that the life of the Nation depends absolutely on the material resources, which have already made the Nation great. Our object is to conserve the foundations of our prosperity. We intend to use these resources; but to so use them as to conserve them. No effort should be made to limit the wise and proper development and application of these resources; every effort should be made to prevent destruction, to reduce waste, and to distribute the enjoyment of our natural wealth in such a way as to promote the greatest good of the greatest number for the longest time.

The Commission must keep in mind the further fact that all the natural resources are so related that their use may be, and should be, coordinated. Thus, the development of water transportation, which requires less iron and less coal than rail

transportation, will reduce the draft on mineral resources; the judicious development of forests will not only supply fuel and structural material, but increase the navigability of streams, and so promote water transportation; and the control of streams will reduce soil erosion, and permit American farms to increase in fertility and productiveness and so continue to feed the country and maintain a healthy and beneficial foreign commerce. The proper coordination of the use of our resources is a prime requisite for continued national prosperity.

The recent Conference of Governors, of the men who are the direct sponsors for the well-being of the States, was notable in many respects; in none more than in this, that the dignity, the autonomy, and yet the interdependence and mutual dependence of the several States were all emphasized and brought into clear relief, as rarely before in our history. There is no break between the interests of State and Nation, these interests are essentially one. Hearty cooperation between the State and the National agencies is essential to the permanent welfare of the people. You, on behalf of the Federal Government, will do your part to bring about this cooperation.

In order to make available to the National Conservation Commission all the information and assistance which it may desire from the Federal Departments, I shall issue an Executive order, directing them to give such help as the Commission may need.

The next session of Congress will end on March 4, 1909. Accordingly, I should be glad to have at least a preliminary report from the Commission not later than January 1 of next year.

Sincerely yours,

(Signed) THEODORE ROOSEVELT

THE INLAND WATERWAYS COMMISSION

ON June 5, 1908, the President reappointed the Inland Waterways Commission, with an increase in number and such extension of function as to authorize the correlation of the administrative Departments and Bureaus of the Federal Government in so far as their work is connected with waterways. The letter of appointment, addressed to the Chairman, Hon. Theodore E. Burton of Ohio, follows:

June 5, 1908.

The Inland Waterways Commission was appointed on March 14, 1907. It was appointed to meet the strongly expressed and reasonable demands of